Functionalized Graphene as Susceptor for High Magnetic Field Induction Heating

Cláudia Silva
Cordelia Zimmerer, Jürgen Pionteck, Petra Pötschke

Leibniz Institute of Polymer Research Dresden, Hohe Str. 6, Dresden, Germany

da-silva@ipfdd.de
zimmerer@ipfdd.de

Magnetic field induction heating appeared in the last years as a promising technique to promote the welding of polymers and polymer-matrix composites. Susceptors, either electrically conductive or magnetically susceptible materials, are needed at the polymers interface to initiate a chemical reaction. [1,2] For this purpose, graphene oxide (GO) and polydopamine-coated graphene oxide (PDA-GO) were synthetized and characterized by X-ray Photoelectron Spectroscopy (XPS), powder electrical conductivity, and specific heat capacity. A new approach was used to prove the reduction of GO by polydopamine by XPS. Several attempts to remove the PDA layer, e.g. using NaOH, to obtain only the reduced GO were performed. The removal of the PDA layer was proven by XPS.
On a next step, GO and PDA-GO films were prepared by spin coating over polycarbonate. The morphology of the films was examined by Scanning Electron Microscopy (SEM). Also, the surface electrical conductivity was measured.
Considering our first results, here we report and discuss a strategy to use these materials as susceptors for magnetic field induction heating.

References

[1] T. Bayerl, M. Duhovic, P. Mitschang, D. Bhattacharyya: Composites Part A 57, 27-40 (2014).
[2] C. Zimmerer, G. Heinrich, F. Wolff-Fabris, E. Koch, G. Steiner: Polymer 54, 6732-6738 (2013).